 IN THE CLAIMS:

Please find below a listing of all pending claims. The statuses of the claims are set forth in parentheses. For those currently amended claims, <u>underlined</u> emphasis indicates insertions and ~~strikethrough~~ emphasis (and/or double brackets) indicates deletions.

1.   (currently amended) A polarization mode dispersion compensator comprising:

a polarization transformer to transform polarization of an input optical signal;

a compensating optical unit to compensate for a polarization mode dispersion of the input optical signal and output an output optical signal;

a polarimeter to measure a state of polarization and a degree of polarization of the output optical signal and generate a feedback signal indicating the measured state of polarization and degree of polarization; and

a control circuit to generate, based on the feedback signal, control signals for adjusting the polarization transformer <u>so</u> ~~in such a way~~ that a plurality of target states of polarization in which the degree of polarization is measured are realized in output optical signals [[in]]<u>of</u> following operations <u>and to search the plurality of target states of polarization for a state of polarization corresponding to a maximum degree of polarization</u>.

2.   (currently amended) The polarization mode dispersion compensator according to claim 1, wherein

the polarization transformer <u>includes</u> ~~is realized by~~ multiple three-electrode structures on a LiNbO$_3$ substrate, whereby control voltages are applied such that a device operation of the polarization transformer corresponds to endless rotatable waveplates.

3.   (currently amended) The polarization mode dispersion compensator according to claim 1, wherein

the compensating optical unit includes at least is realized in such a way that
an amount of differential group delay is introduced by one of a polarization
maintaining fiber and a birefringent crystal to introduce an amount of different group
delay.

4.   (currently amended) The polarization mode dispersion compensator according
to claim 1, wherein
        the compensating optical unit includes comprises a plurality of sections of
differential group delay introducing elements separated by at least one individually
controllable variable retarder with an eigenaxis oriented at an angle of 45 degree
with respect to an eigenaxis of each of two adjacent differential group delay
introducing elements.

5.   (canceled)

6.   (currently amended) The polarization mode dispersion compensator according
to claim [[5]]1, wherein
        the control circuit records the measured state of polarization and degree of
polarization, and calculates from polarization changes control signals for adjusting
the polarization transformer in such a way that the target states of polarization are
equally separated from each other and equally distant from an [[the]] actual state in
a[[the]] polarization space.

7.   (currently amended) The polarization mode dispersion compensator according
to claim 6, wherein
        the target states of polarization are preset and located on a circle around at
[[the]] actual state at a predefined distance in a [[the]] polarization space.

8.   (currently amended) The polarization mode dispersion compensator according
to claim [[5]]1, wherein

the control circuit records the measured state of polarization and degree of
polarization, calculates from polarization changes control signals for adjusting the
polarization transformer in such a way that the target states of polarization are
unequally separated from each other and unequally distant from the actual state in
the polarization space, and weights measured degrees of polarization in the target
states of polarization by using a distance between each target state of polarization
and an [[the]] actual state in a [[the]] polarization space.

9.   (original) The polarization mode dispersion compensator according to claim 1,
wherein

the control circuit recognizes changing device characteristics of the
polarization transformer in a case where a part of the target states of polarization
are not realized, and takes countermeasures such that the polarization transformer
operates like endless rotatable waveplates by recalculating a voltage which describes
the device characteristics of the polarization transformer and generating a control
signal for applying the calculated voltage to the polarization transformer.

10.   (currently amended) A polarization mode dispersion compensator comprising:

a polarization transformer to transform polarization of an input optical signal;

a compensating optical unit to compensate for a polarization mode dispersion
of the input optical signal and output an output optical signal;

a distortion analyzer to measure a state of polarization and a distortion of the
output optical signal and generate a feedback signal indicating the measured state
of polarization and distortion; and

a control circuit to generate, based on the feedback signal, control signals for
adjusting the polarization transformer so in such a way that a plurality of target
states of polarization in which the distortion is measured are realized in output

4

optical signals of [[in]] following operations and to search the plurality of target
states of polarization for a state of polarization corresponding to a maximum degree
of polarization.

11.   (currently amended) A method of polarization mode dispersion compensation,
comprising:

        transforming polarization of an input optical signal through a polarization
transformer;

        compensating for a polarization mode dispersion of the input optical signal
through a compensating optical unit to generate an output optical signal;

        measuring a state of polarization and a distortion of the output optical signal
to generate a feedback signal indicating the measured state of polarization and
distortion; and

        adjusting the polarization transformer according to the feedback signal so in
such a way that a plurality of target states of polarization in which the distortion is
measured are realized in output optical signals of [[in]] following operations and to
search the plurality of target states of polarization for a state corresponding to a
maximum degree of polarization.

12.   The polarization mode dispersion compensator according to claim 1, wherein
the maximum degree of polarization is a maximum degree of polarization in a
circumference of an actual state in a polarization space.

13.   The polarization mode dispersion compensator according to claim 1, wherein
the control signals are adjusted to drive the polarization transformer according to the
state of polarization corresponding to a maximum degree of polarization.

14.   The polarization mode dispersion compensator according to claim 10, wherein the maximum degree of polarization is a maximum degree of polarization in a circumference of an actual state in a polarization space.

15.   The polarization mode dispersion compensator according to claim 10, wherein the control signals are adjusted to drive the polarization transformer according to the state of polarization corresponding to a maximum degree of polarization.

16.   The method of polarization mode dispersion compensation according to claim 11, wherein the maximum degree of polarization is a maximum degree of polarization in a circumference of an actual state in a polarization space.

17.   The method polarization mode dispersion compensation according to claim 11, wherein the control signals are adjusted to drive the polarization transformer according to the state of polarization corresponding to a maximum degree of polarization.